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SHORT COMMUNICATION

New records of the alien longhorn beetle *Neoclytus acuminatus* (Coleoptera: Cerambycidae) in Romania

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Abstract

Neoclytus acuminatus is an alien longhorn beetle native to North America and currently established in Europe where it has a relatively wide distribution. Herein, its distribution in Romania is summarized based on new data accumulated since its first record fifteen years ago. Some aspects on its biology and morphology are discussed.

Keywords

Allochthonous species, citizen science, distribution, xylophagous.

About 20 species of alien longhorn beetles are known to have been introduced and established in Europe, some of them being present on the Old Continent at least since the middle 19th century (Cocquempot and Lindelöw 2010; Leivadara et al. 2018; Sarto i Monteys and Torras i Tutusaus 2018; Cocquempot et al. 2019). With the intensification of global trade in the last decades, some 20 other alien cerambycid species were

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intercepted or recorded but not established (Cocquempot 2007; Cocquempot and Mifsud 2013).

Of all established alien species, several are members of the tribe Clytini: *Chlorophorus annularis* (Fabricius, 1787), *Xylotrechus stebbingi* Gahan, 1906, *Xylotrechus chinensis* (Chevrolat, 1852), and *Neoclytus acuminatus* (Fabricius, 1775). They all originate from Asia except the last one that originates from North America. Another Clytini, *Xylotrechus grayii* (White, 1855), which is a serious pest of *Lonicera japonica* Thunb. in Asia, is considered to have a small risk of establishment in Europe (Cocquempot 2007). Two more Asian species, *Xylotrechus altaicus* (Gebler, 1836) and *Turanoclytus namanganensis* (Heyden, 1885), were included on the EPPO A2 list of quarantine pests which require specific control measures (EPPO 2005a, b).

The genus *Neoclytus* Thomson, 1860 is confined to the Nearctic and Neotropical regions and includes almost 60 species and subspecies (Bezark 2016). *Neoclytus acuminatus*, also known as the redheaded ash borer, is native to North America and introduced to Puerto Rico, Cuba, and Argentina (Bezark 2016; Monné 2020). It was also introduced to Europe with the oldest records, as discussed by Pennerstorfer and Kriechbaum (2018), coming from the North Adriatic region: Rijeka (Küster 1851), Zadar (1891, in Jurc et al. 2016), and Istria (Reitter 1912). The collection of Ferdinand Jožef Schmidt proves that around the middle 19th century this species was also present in Kranjsko (Carniola) (Brelih et al. 2006). The species naturalized itself in this region for a long time (Mikšić 1971; Mikšić and Georgijević 1973) and from here spread in many other adjacent European countries (Keszthelyi 2021). In Europe the species was recorded so far from Portugal (Madeira), France, Germany, Italy, Switzerland, Austria, Czechia, Hungary, Slovenia, Croatia, Montenegro, Serbia, Romania (Manci 2005; Cocquempot and Lindelöw 2010; Pennerstorfer and Kriechbaum 2018), UK (Buckle 1902; Duffy 1953), and Slovakia (Danilevsky 2020).

In Romania it was firstly recorded by Manci (2005) from Timișoara, in the western part of the country, based on a single specimen collected in 2002, hence the establishment of this species in our fauna was uncertain. It was reported a second time only recently based on specimens collected in 2015 from two forested sites, in the Iron Gates Natural Park (Brodie et al. 2019). According to newer records, *N. acuminatus* is currently widespread in Romania being found so far in 19 locations from 9 counties (Fig. 1). We included both observations based on collected specimens and pictures obtained via citizen science (from the Facebook group Insects of Romania and Europe, Nature Digital Object Repository, and BioLib databases). In chronological order of the first observation, they are as follows:

Sfânta Elena, Caraș-Severin co., 44°40'40.5222"N 21°42'43.2822"E, 20.VI.2012, obs. and photo Stanislav Krejčík; Dubova, Mehedinți co., 44°36'33.48"N 22°15'11.63"E, 8.VIII.2014, on *Robinia pseudoacacia* L., leg. and coll. Cosmin Ovidiu Manci (at least 10 specs., 7 collected); Zlătunoaia, Botoșani co., 47°39'00.4"N 27°01'08.0"E, 06.V.2016, obs. and photo Adrian Spătăreanu and Ana Maria Matei (1 spec., not collected); Șag, Timiș co., 45°39'29.5"N 21°12'53.6"E, VI–VII.2016, and VI–VII.2017, on *R. pseudoacacia* logs and dead branches, obs. and photo Adorian Ardelean (few specs.,

not collected); Timișoara (Freidorf area), Timiș co., 45°43'19.92"N 21°10'13.44"E, 14.IX.2016, obs. and photo Adorian Ardelean (few specs., not collected); same locality and observer, VI–IX.2019, on logs of *Carpinus* sp. and *Albizia julibrissin* Durazz. (few specs., not collected); same locality and observer except 45°43'24.1"N 21°10'32.5"E, 9.VI.2016 (few specs., not collected); same locality and observer, 5.VI.2018, on logs of *A. julibrissin* (few specs., not collected); Timișoara, Timiș co., 45°45'16.6"N 21°16'46.2"E, 5.VIII.2019, on *Salix* sp., obs. and photo Danka Dragomir (2 specs. not collected); Sasca Montană, Caraș-Severin co., 44°52'13.1"N 21°43'55.6"E, 17.VI.2018, obs. and photo Adorian Ardelean (few specs., not collected); Scorțaru Vechi, Brăila co., 45°13'11.3"N 27°44'49.6"E, 4.V.2019, on dead *R. pseudoacacia* branches, obs. and photo Andreea Gabriela Nechifor (1 spec., not collected); Dumbrăvița, Timiș co., 45°47'34.2"N 21°13'58.8"E, 4.V.2019, on *Prunus armeniaca* L., obs. and photo Danka Dragomir (2 specs. in copula, not collected); Băița, Bihor co., 46°28'53.84"N 22°35'30.12"E, 25.V.2019, edge of forest, leg. Bryan Marcus, coll. Cosmin Ovidiu Manci (7 specs.); Pârcovaci, Hârlău, Iași co., 47°26'46.2"N 26°50'18.8"E, on wooden fence, leg. and coll. Lucian Hănceanu, 15.V.2020 (1 spec.) and 7.VI.2021 (32 specs.); same locality and collector except 47°26'58.3"N 26°50'27.3"E, on logs, 26.IV.2021 (20 specs.) and 07.VI.2021 (50 specs.); Alba Iulia, Alba co., 46°04'56.3"N 23°33'47.9"E,

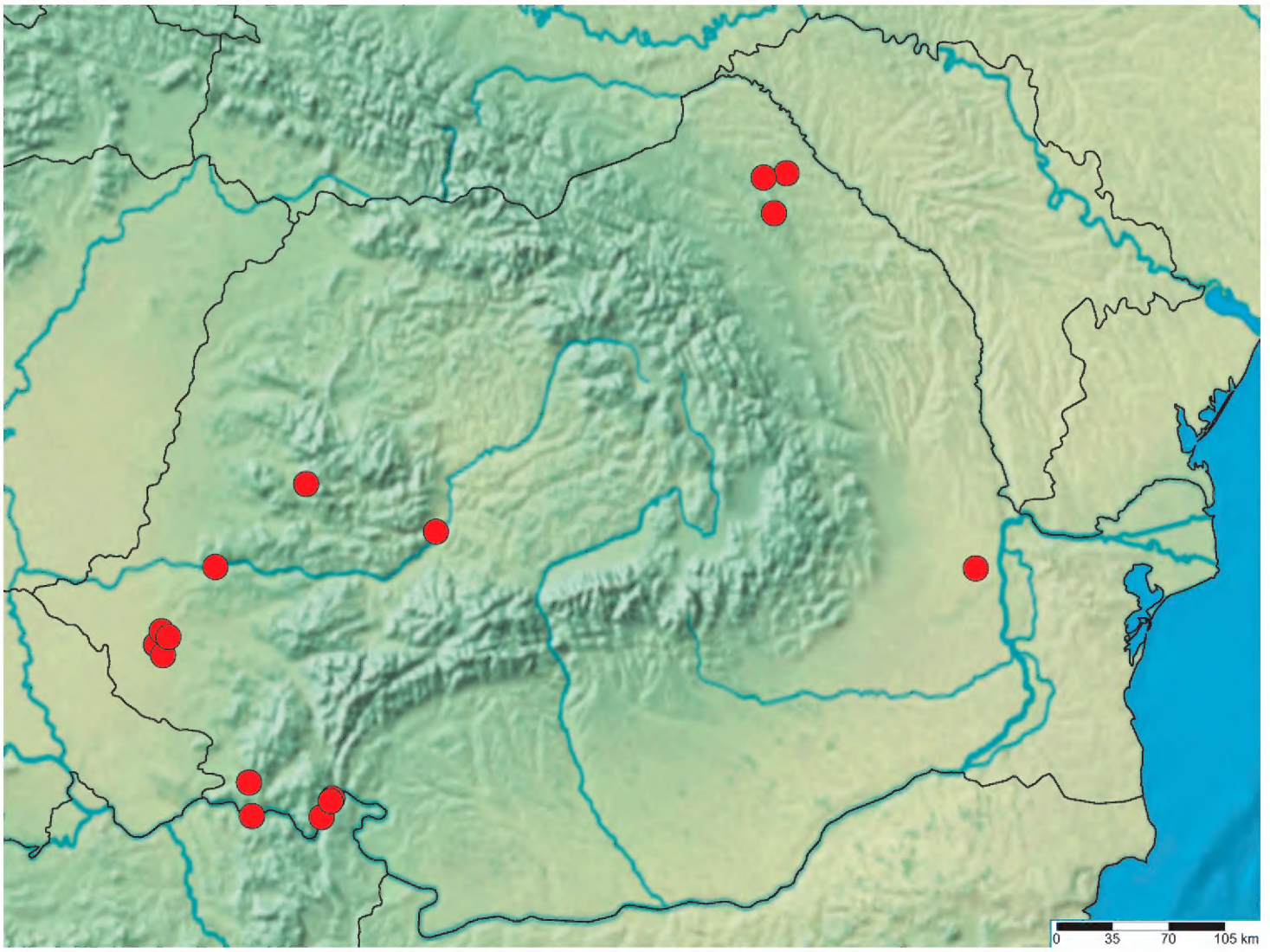

Figure 1. Distribution of *Neoclytus acuminatus* in Romania (sites in closed proximity are not displayed on the map). The map was generated with the software SimpleMappr (https://www.simplemappr.net).

18.V.2020, obs. and photo Sebastian Marian Ianco (1 spec., not collected); Șoimoș, Arad co., 46°06'13.0"N 21°44'49.9"E, 25.V.2020, leg. and coll. Alexandru-Mihai Pintilioaie (2 specs. in copula); Draxini, Botoșani co., 47°39'24.8"N 26°49'25.7"E, 30.V.2020, on *Quercus* sp. and *Ulmus* sp. wood piles, obs. and photo Ionuț Nacu (1 spec., not collected).

Neoclytus acuminatus is a xilophagous species, polyphagous on a broad range of deciduous trees, shrubs, and vines, including fruit trees, ornamental shrubs, and grape vine (Craighead 1923; Bense 1995; Maier 2018). The records from *Pinus* and *Taxodium* were considered doubtful (Craighead 1923), however it was recently confirmed to develop in conifers like *Abies, Chamaecyparis*, *Cryptomeria, Juniperus*, *Picea*, and *Tsuga* (Maier 2009, 2018). It is believed that it was introduced to Europe with infested North American ash timber (Csóka and Kovács 1999; Jurc et al. 2016). In Europe and northern USA, the beetle takes one to two years to complete its life cycle (Bense 1995; Solomon 1995; Sama 2002), while in southern USA there may be two to three generations per year (Solomon 1995). Compared to many other species of Clytini that frequently visit flowers, adults of *N. acuminatus* apparently do not feed (Hanks and Wang 2017) and only occasionally visit blooming shrubs (Bense 1995). Otherwise, in sunny days they can be found on the host trees, logs or woodpiles, from April to August. The males produce an aggregation pheromone, that is why sometimes numerous individuals of both sexes aggregate on the host trees (Lacey et al. 2004). Tens of individuals (many of them in copula) were seen by the first author in Hârlău, near Pârcovaci forest, on logs deposited in yards for household heating. After mating, the females lay eggs in bark crevices and cracks, on trunks and branches. Larvae firstly develop under the bark then penetrate in the sapwood by digging tunnels filled with frass, but never feed in the heartwood (Solomon 1995). It overwinters as larva and pupation takes place in early spring in a pupal chamber close to the outer sapwood edge. The new generation of beetles emerges through round exit holes (2 to 5 mm in diameter) made in the bark with their mandibles (Solomon 1995).

Neoclytus acuminatus generally attacks weak, dying or recently dead trees but also newly planted trees and nursery stock. Freshly cut logs with bark still attached are also a source of infestation if these are not removed from the forest after cutting. The quality of the wood that will be processed into lumber is affected in case of infestations (Solomon 1995). In Romania it was found on the allochthonous trees *R. pseudoacacia* and *A. julibrissin,* on native trees (*Carpinus* sp., *Quercus* sp., *Salix* sp., *Ulmus* sp.), and on fruit trees (*P. armeniaca*). There are no quantitative data on the extent of the economic damage or potential ecological impact on the autochthonous fauna neither for Romania nor for other European countries (Cocquempot and Lindelöw 2010), although in its native range it is considered a pest (Sama 2002; Solomon 1995).

Clytini are known to be Batesian mimics that exhibit a coloration and a habitus resembling aculeate hymenopterans (Linsley 1959), and most likely the contrasting reddish-brown, yellow, and black colours of *N. acuminatus* are due to wasp mimicry. This beetle can be recognized by its slender, cylindrical, and elongate body with reddish brown coloration, long legs, short, distally thickened antennae, and four

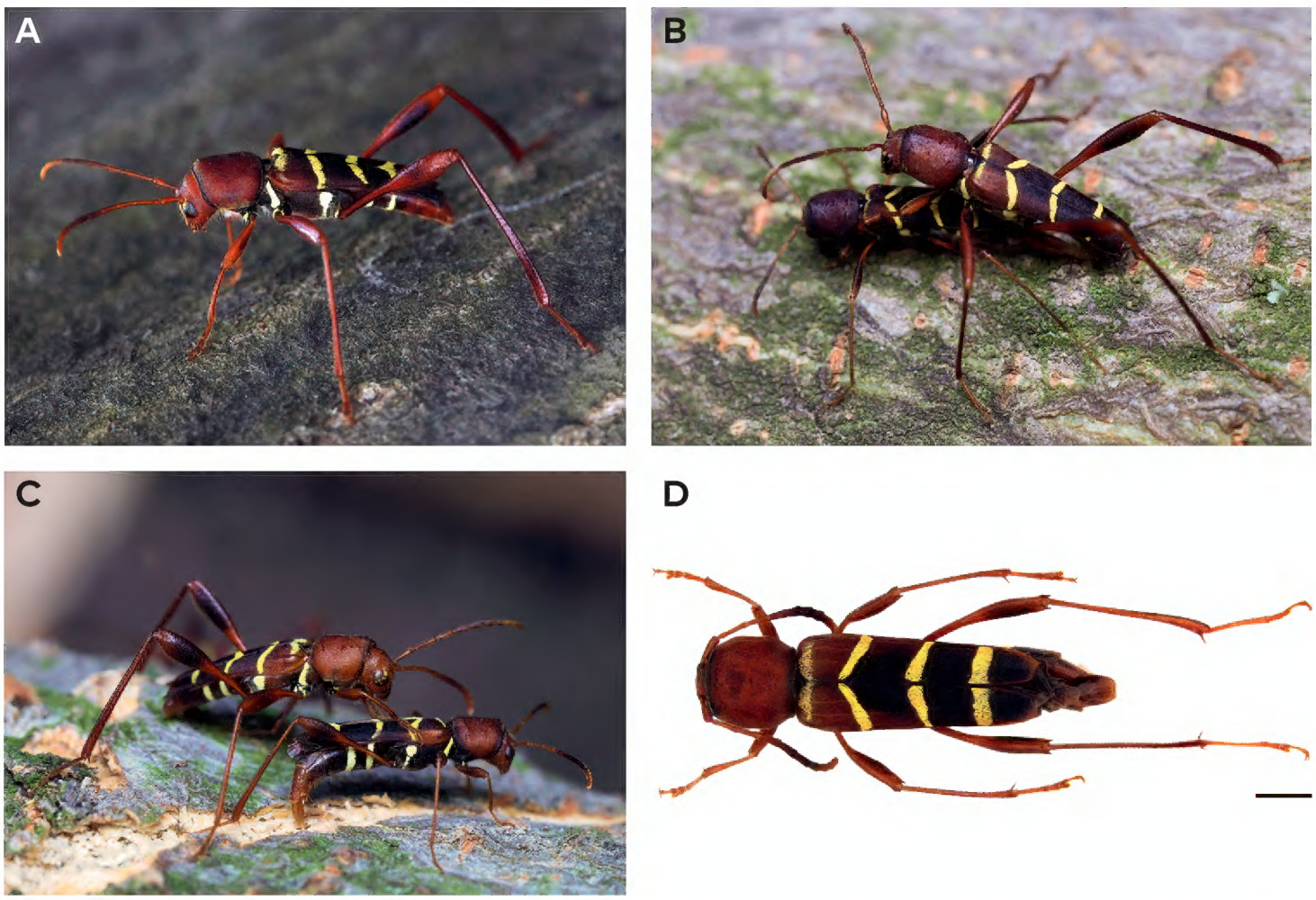

Figure 2. *Neoclytus acuminatus*. **A–C** adults in situ (photos by Adorian Ardelean, Timişoara); **D** habitus, specimen from Pârcovaci; scale bar: 2 mm.

transverse yellow stripes on elytra (Fig. 2). An exhaustive description of the larva was made by Švácha and Danilevsky (1988); descriptions of larva and pupa may also be found in the monographs of Craighead (1923) and Duffy (1953).

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